



Natural Resources Conservation Service
P.O. Box 2890
Washington, D.C. 20013

Weekly Report - Snowpack / Drought Monitor Update Date: 29 October 2009

SNOTEL SNOWPACK AND PRECIPITATION SUMMARY

Temperature: SNOTEL and ACIS-day station average weekly temperature anomalies show a return to a mostly colder than average pattern across the West (Fig.1). ACIS 7-day average temperature anomalies show that the greatest positive temperature departures occurred over southern California (>+3F) and the greatest negative departures occurred over the eastern region of Colorado (<-9F) (Fig. 1a).

Precipitation: ACIS 7-day average precipitation amounts for the period ending 28 October shows dry conditions over much of California, southern Nevada and southwest Arizona with some heavier precipitation over the North Cascades in Washington. In terms of percent of normal precipitation, much of the Northern Tier States and the Colorado-New Mexico Rockies had well above average totals (Fig 2 and 2a). Seasonal precipitation (rain & snow water equivalent) as a percent of normal for the 2010 Water Year that began on October 1, 2009 shows rather exaggerated values since the Water Year is only 29 days old. Marked increases occurred over the Pacific Northwest, Northern Rockies and Utah since last week (Fig. 2b).

WESTERN DROUGHT STATUS

The West: Compared to last week, relatively minor changes in the depiction of drought were made this week. Multiple storm systems triggered widespread rainfall across western Oregon, Washington, northern Idaho and Montana. Improvements, coinciding with 1.5 to 6.0 inches of rainfall, were made in Washington along a broad swath from Tacoma to the Canadian border. Additional improvements were made across the Olympic Peninsula (Grays Harbor County) and along the coastal ranges in Oregon. Rainfall amounts of 1.5 to 3.0 inches prompted this improvement. Further east, rainfall amounts of 2.0 to 3.0 inches prompted improvements in northern Idaho and northwestern Montana.

Based on local inputs from emergency managers and precipitation totals near 0.5 inches, improvements were made in southwest Colorado. Severe drought was removed from the state, and the abnormally dry conditions farther east were trimmed to reflect rainfall totals of 0.5 to 1.5 inches.

Some degradation was in order around the Lake Tahoe area. Last week's heavy rains were supplanted with near zero readings for rainfall and slightly above normal temperatures (1 to 2 degrees F) this week. Lake Tahoe is back down to just 0.02 feet above the rim. At 82 percent of average storage, Truckee Basin Reservoirs are in better shape. Additionally, Sierra snowpack has already dwindled back to near nothing. Author: Matthew Rosencrans, NOAA/NWS/NCEP/CPC

A comprehensive narrative describing drought conditions for the nation can be found at the end of this document.

Weekly Snowpack and Drought Monitor Update Report

DROUGHT IMPACTS DEFINITIONS (<http://drought.unl.edu/dm/classify.htm>)

The possible impacts associated with **D4 (H, A)** drought include widespread crop/pasture losses and shortages of water in reservoirs, streams, and wells creating water emergencies. The possible impacts associated with **D3 (H, A)** drought include major crop/pasture losses and widespread water shortages or restrictions. Possible impacts from **D2 (H, A)** drought are focused on water shortages common and water restrictions imposed and crop or pasture losses likely. The possible impacts associated with **D1 (H, A)** drought are focused on water shortages developing in streams, reservoirs, or wells, and some damage to crops and pastures (Figs. 3, 3a, and 3b).

SOIL MOISTURE

Soil moisture (Figs. 4a and 4b), is simulated by the [VIC macroscale hydrologic model](#). The detailed, physically-based VIC model is driven by observed daily precipitation and temperature maxima and minima from approximately 2130 stations, selected for reporting reliably in real-time and for having records of longer than 45 years (and various other criteria). Another good resource can be found at: <http://www.emc.ncep.noaa.gov/mmb/nldas/drought/>.

OBSERVED FIRE DANGER CLASS

The [adjective class rating](#) is a method of normalizing rating classes across different fuel models, indexes, and station locations. It is based on the primary fuel model cataloged for the station, the fire danger index selected to reflect staffing levels, and climatological class breakpoints. This information is provided by local station managers. About 90% use the Burning Index (BI); others use Energy Release Component (ERC). Staffing class breakpoints are set by local managers from historical fire weather climatology (Figs. 5).

VEGETATION STRESS (Figure 6)

(http://www.star.nesdis.noaa.gov/smcd/emb/vci/VH/vh_currentImage.php)

Image Interpretation

The images are color-coded maps of vegetation condition (health) estimated by the Vegetation and Temperature Condition Index (VT). The VT is a numerical index, which changes from 0 to 100 characterizing change in vegetation conditions from extremely poor (0) to excellent (100). Fair conditions are coded by green color (50), which changes to brown and red when conditions deteriorate and to blue when they improve. The VT reflects indirectly a combination of chlorophyll and moisture content in the vegetation and also changes in thermal conditions at the surface. This new approach combines the visible, near infrared and thermal radiances in a numerical index characterizing vegetation health. This approach is extremely useful in detecting and monitoring such complex and difficult-to-identify phenomenon as drought. The VT values below 35 are used for identifying vegetation stress which is an indirect drought indicator. The VT is very useful for early drought detection, assessing drought area coverage, duration, and intensity, and for monitoring drought impacts on vegetation and agricultural crops.

U.S. HISTORICAL STREAMFLOW

This map, (Fig. 7) shows the 7-day average streamflow conditions in hydrologic units of the United States and Puerto Rico for the day of year. The colors represent 7-day average streamflow percentiles based on historical streamflow for the day of the year. Thus, the map shows conditions adjusted for this time of the year. Only stations having at least 30 years of record are used. Sub-regions shaded gray indicate that insufficient data were available to compute a reliable 7-day average streamflow value. During winter months, this situation frequently arises due to ice effects. The data used to produce this map are provisional and have not been reviewed or edited. They may be subject to significant change.

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http://water.usgs.gov/cgi-bin/waterwatch?state=us&map_type=dryw&web_type=map.

STATE ACTIVITIES

State government drought activities can be tracked at the following URL:

<http://drought.unl.edu/mitigate/mitigate.htm>. NRCS SS/WSF State Office personnel are participating in state drought committee meetings and providing the committees and media with appropriate SS/WSF information -

<http://www.wcc.nrcs.usda.gov/cqibin/bor.pl>. Additional information describing the products available from the Drought Monitor can be found at the following URL: <http://drought.unl.edu/dm/> and <http://drought.gov>.

FOR MORE INFORMATION

The National Water and Climate Center Homepage provide the latest available snowpack and water supply information. Please visit us at

<http://www.wcc.nrcs.usda.gov>. This document is available from the following location on the NWCC homepage - <http://www.wcc.nrcs.usda.gov/water/drought/wdr.pl>

This report uses data and products provided by the Interagency Drought Monitor Consortium members and the National Interagency Fire Center.

/s/ NOLLER HERBERT
Director, Conservation Engineering Division

Weekly Snowpack and Drought Monitor Update Report

SNOTEL (solid) and ACIS (dot-filled) Networks 7-Day Average Temperature Anomaly (Degrees F)

Oct 29, 2009

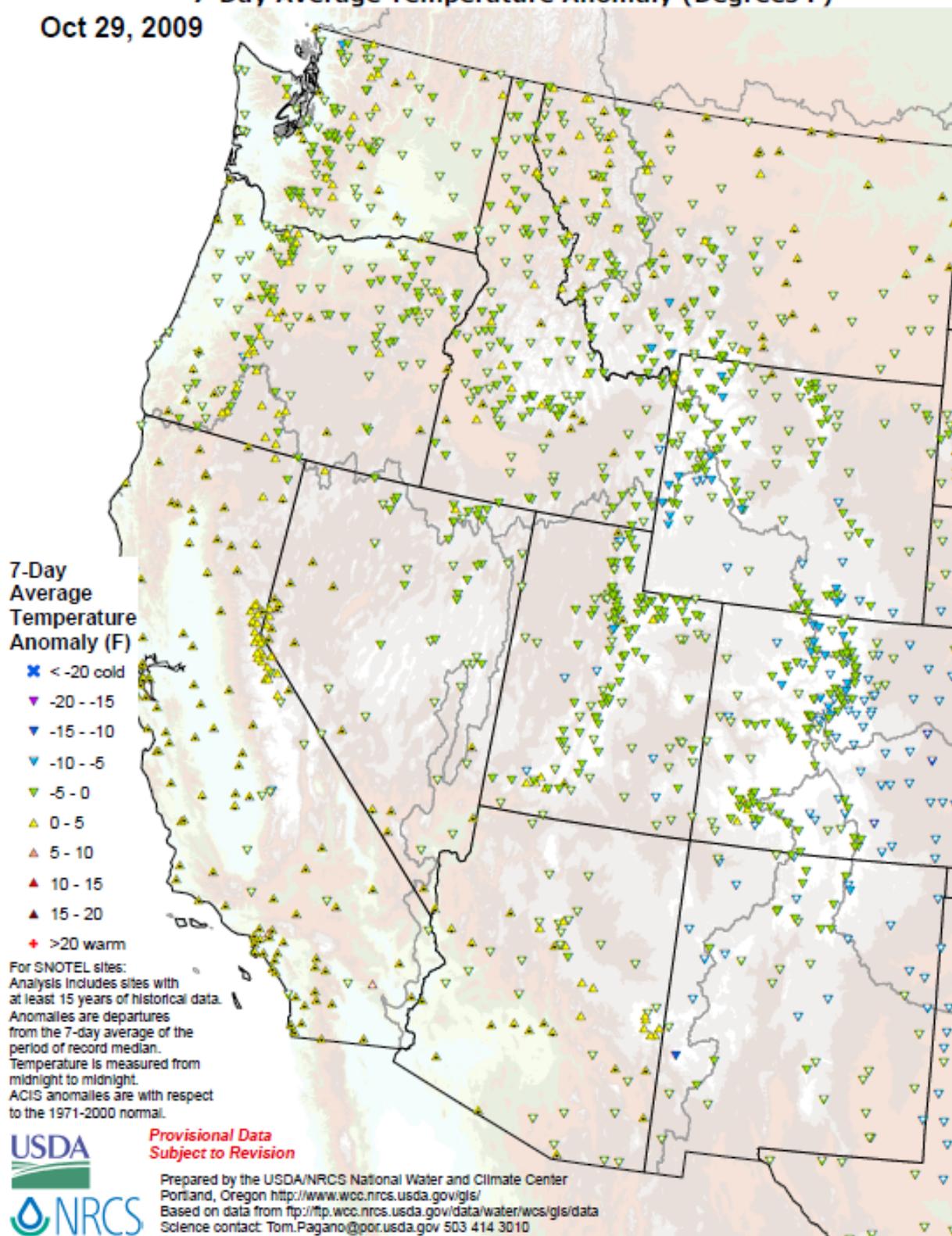
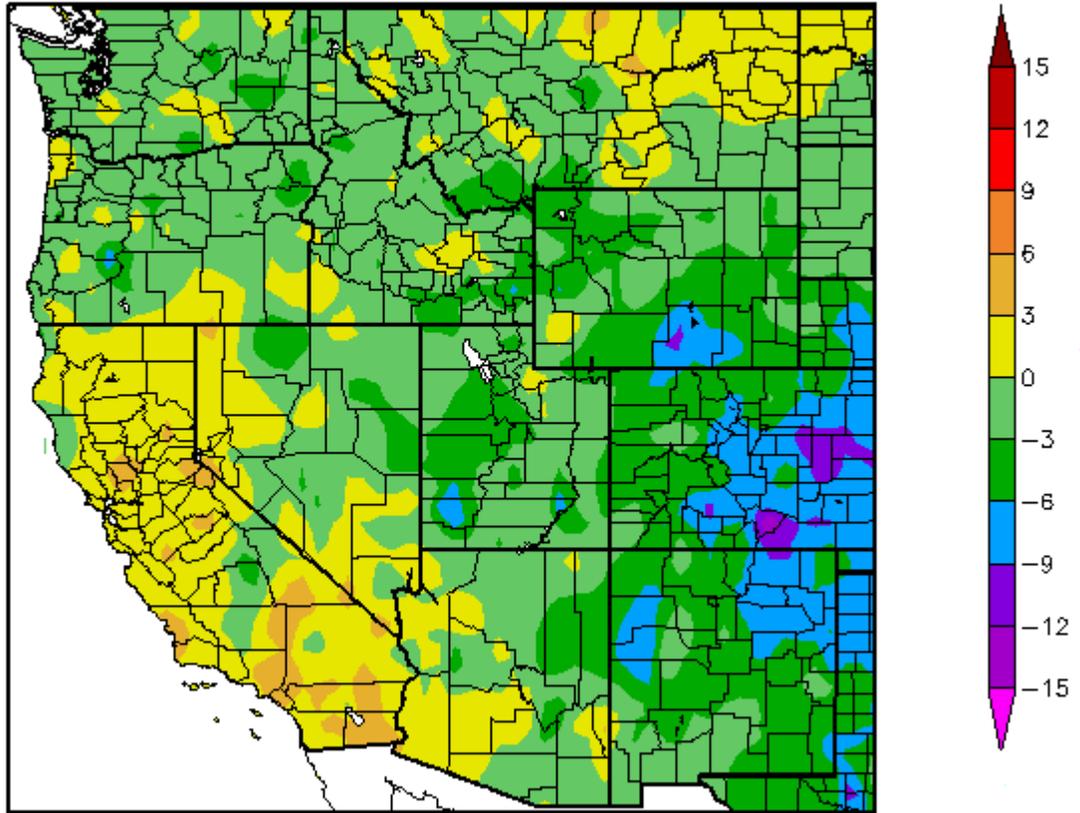


Fig. 1. SNOTEL and ACIS-day station average weekly temperature anomalies show a return to a mostly colder than average pattern across the West.

Ref: <ftp://ftp.wcc.nrcs.usda.gov/data/water/wcs/gis/maps/WestwideTavg7dAnomalyAcis.pdf>

Departure from Normal Temperature (F)
10/22/2009 – 10/28/2009



Generated 10/29/2009 at HPRCC using provisional data.

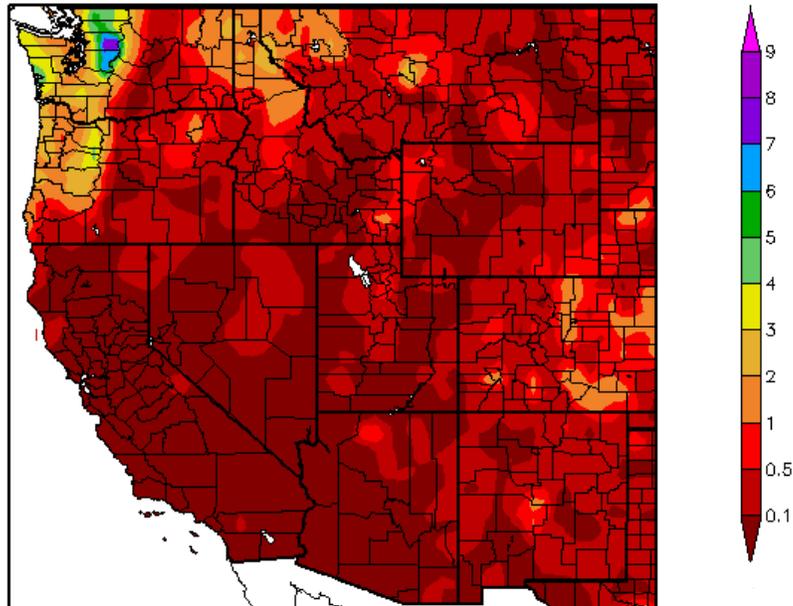
NOAA Regional Climate Centers

Fig. 1a. ACIS 7-day average temperature anomalies show that the greatest positive temperature departures occurred over southern California (>+3F) and the greatest negative departures occurred over the eastern region of Colorado (<-9F).

Ref: http://www.hprcc.unl.edu/maps/current/index.php?action=update_product&product=TDept

Weekly Snowpack and Drought Monitor Update Report

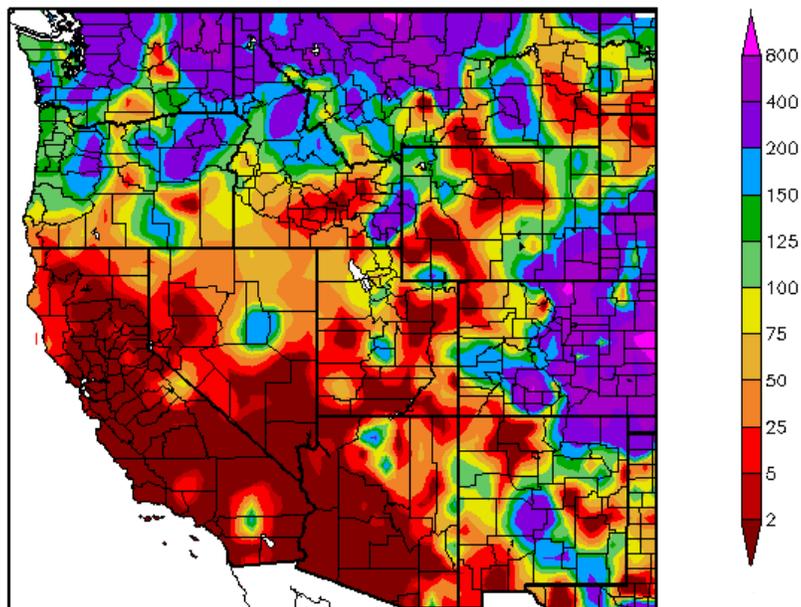
Precipitation (in)
10/22/2009 – 10/28/2009



Generated 10/29/2009 at HPRCC using provisional data.

NOAA Regional Climate Centers

Percent of Normal Precipitation (%)
10/22/2009 – 10/28/2009



Generated 10/29/2009 at HPRCC using provisional data.

NOAA Regional Climate Centers

Fig. 2. and 2a. ACIS 7-day average precipitation amounts for the period ending 28 October shows dry conditions over much of California, southern Nevada and southwest Arizona with me some heavier precipitation over the North Cascades in Washington. In terms of percent of normal precipitation, much of the Northern Tier States and the Colorado-New Mexico Rockies had well above average totals. Ref: <http://www.hprcc.unl.edu/maps/current/>.

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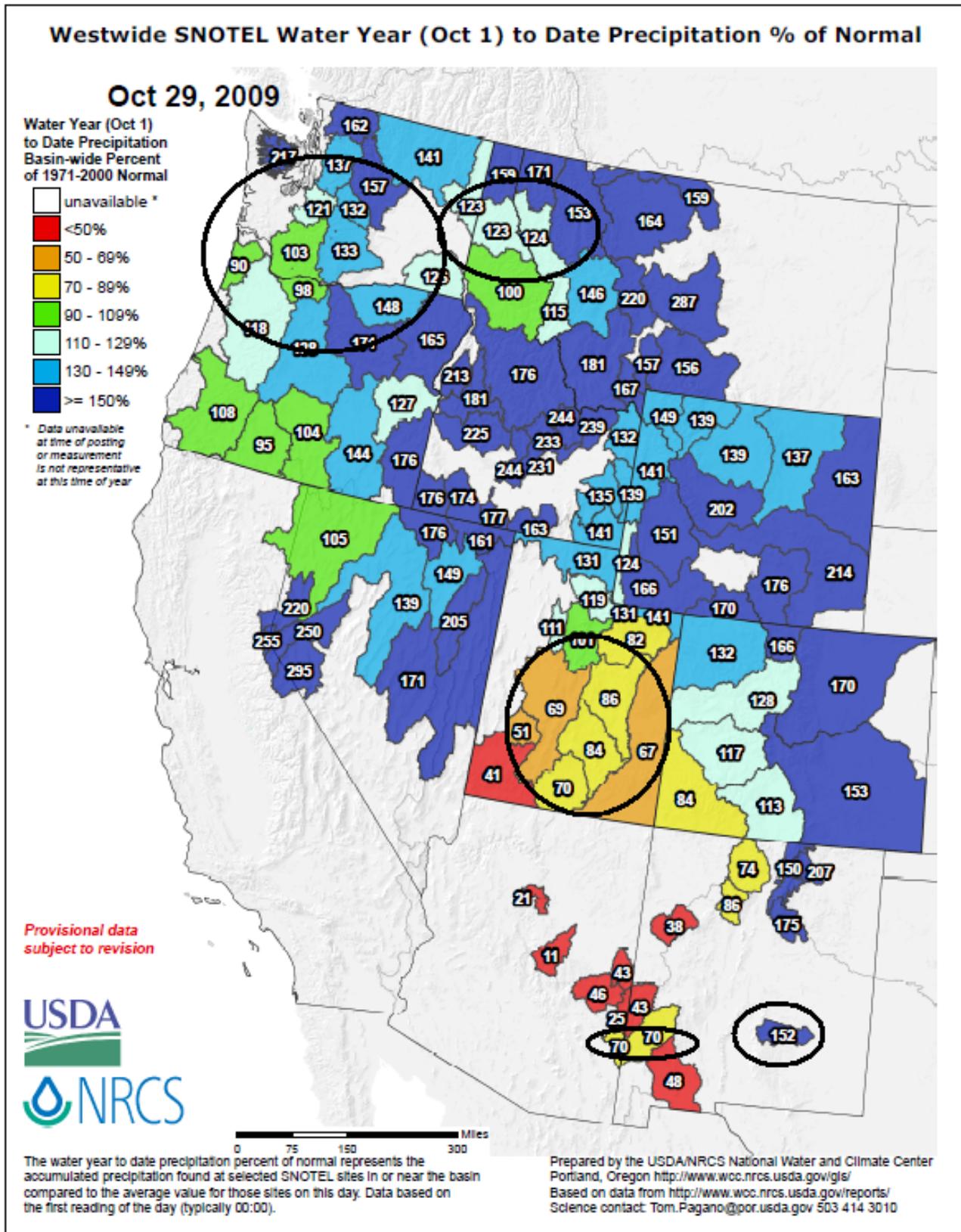
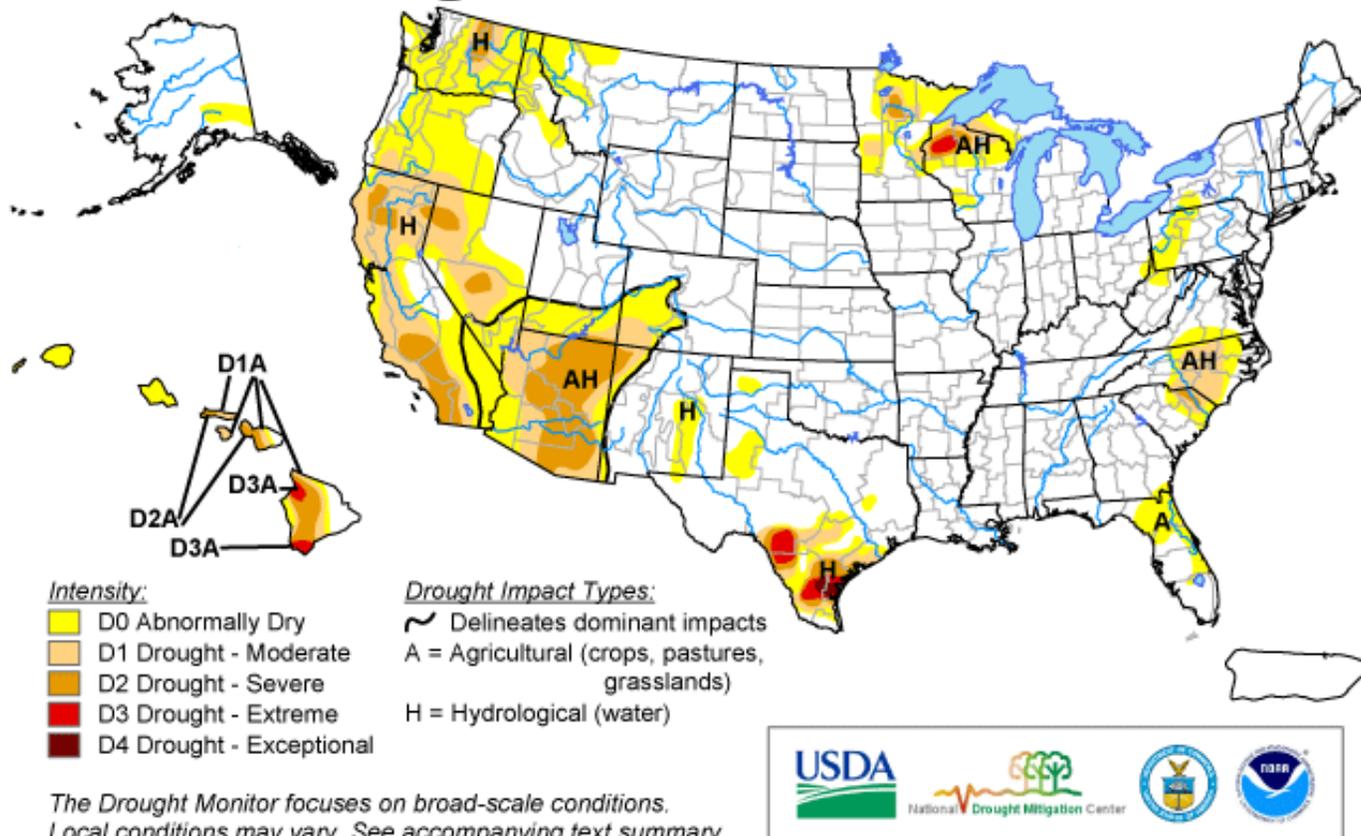


Fig 2b. Seasonal precipitation (rain & snow water equivalent) as a percent of normal for the 2010 Water Year that began on October 1, 2009 shows rather exaggerated values since the Water Year is only 29 days old. Circled areas show marked increases since last week.

Ref: ftp://ftp.wcc.nrcs.usda.gov/data/water/wcs/gis/maps/west_wytdprecpcnormal_update.pdf.

U.S. Drought Monitor

October 27, 2009
Valid 8 a.m. EDT



Released Thursday, October 29, 2009
Author: Matthew Rosencrans, NOAA/NWS/NCEP/CPC

Fig. 3. Current Drought Monitor weekly summary.

Ref: National Drought Mitigation Center (NDMC) - <http://www.drought.unl.edu/dm/monitor.html>

U.S. Drought Monitor

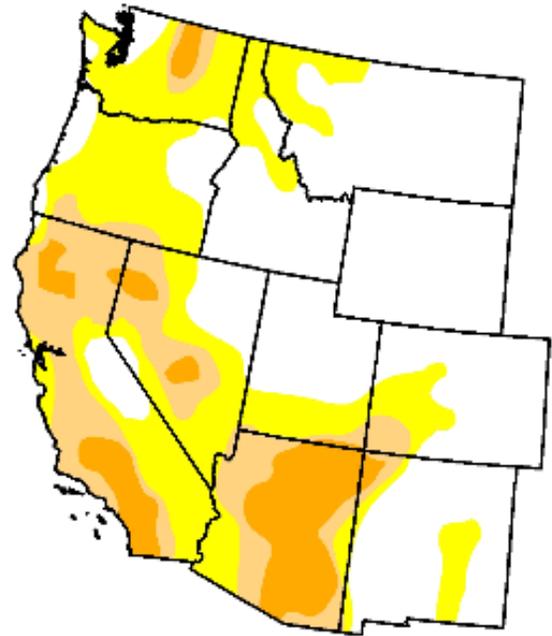
West

October 27, 2009

Valid 7 a.m. EST

Drought Conditions (Percent Area)

	None	D0-D4	D1-D4	D2-D4	D3-D4	D4
Current	51.0	49.0	22.9	8.9	0.0	0.0
Last Week (10/20/2009 map)	47.0	53.0	22.8	9.1	0.0	0.0
3 Months Ago (08/04/2009 map)	54.4	45.6	17.1	7.5	0.0	0.0
Start of Calendar Year (01/06/2009 map)	37.4	62.6	28.9	8.8	0.4	0.0
Start of Water Year (10/06/2009 map)	42.1	57.9	25.4	8.5	0.0	0.0
One Year Ago (10/28/2008 map)	39.9	60.1	30.0	10.4	0.0	0.0



Intensity:

- D0 Abnormally Dry
- D1 Drought - Moderate
- D2 Drought - Severe
- D3 Drought - Extreme
- D4 Drought - Exceptional

The Drought Monitor focuses on broad-scale conditions. Local conditions may vary. See accompanying text summary for forecast statements



Released Thursday, October 29, 2009

Author: M. Rosenkrans, CPC/NOAA

<http://drought.unl.edu/dm>

Fig. 3a. Drought Monitor for the Western States with statistics over various time periods. Regionally, there was some improvement in the D0 category during the past week.
 Ref: http://www.drought.unl.edu/dm/DM_west.htm.

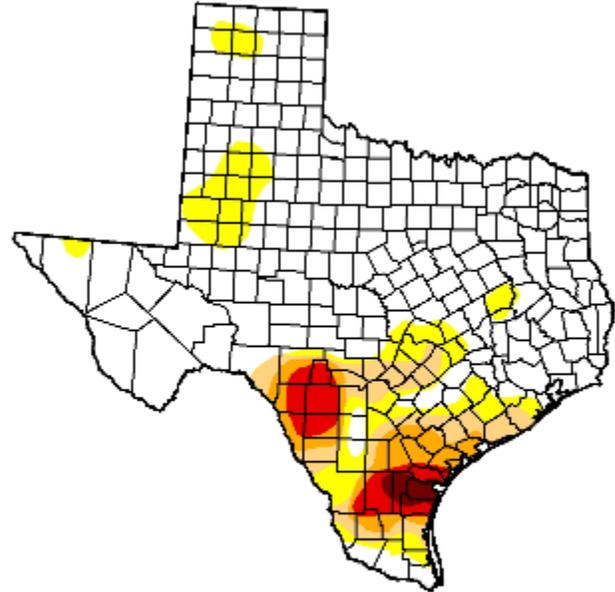
U.S. Drought Monitor

Texas

October 27, 2009
Valid 7 a.m. EST

Drought Conditions (Percent Area)

	None	D0-D4	D1-D4	D2-D4	D3-D4	D4
Current	73.6	26.4	14.8	8.7	4.3	0.9
Last Week (10/20/2009 map)	65.0	35.0	20.8	13.7	6.8	1.5
3 Months Ago (08/04/2009 map)	50.0	50.0	34.1	28.9	26.6	16.8
Start of Calendar Year (01/06/2009 map)	41.7	58.3	24.5	15.0	9.1	4.2
Start of Water Year (10/06/2009 map)	66.1	33.9	22.4	14.5	6.8	1.5
One Year Ago (10/28/2008 map)	61.1	38.9	22.4	15.2	5.0	0.0



Intensity:



The Drought Monitor focuses on broad-scale conditions. Local conditions may vary. See accompanying text summary for forecast statements



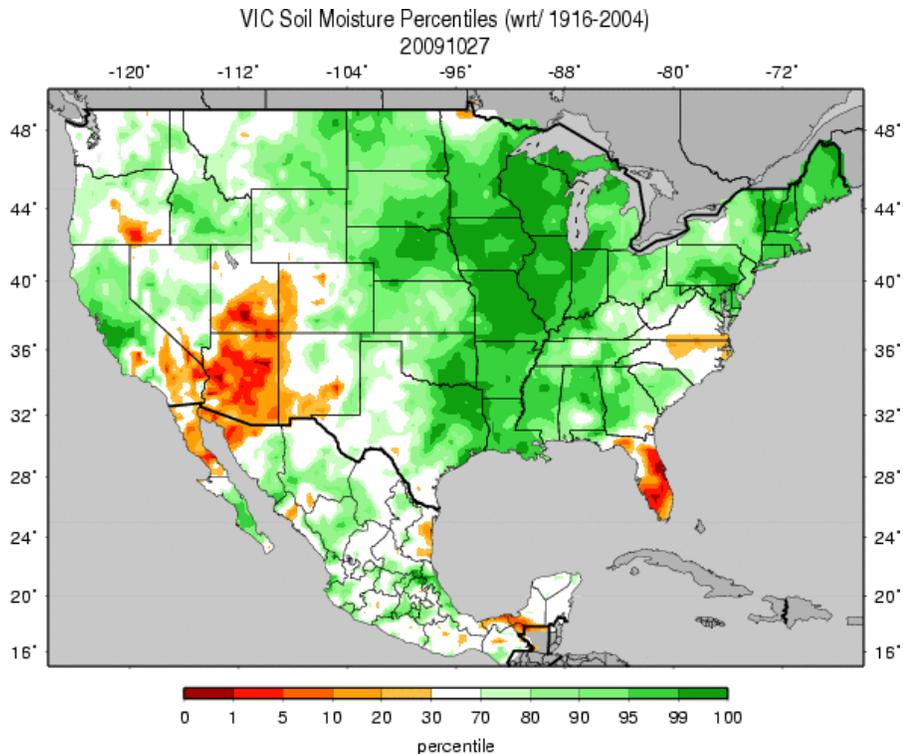
Released Thursday, October 29, 2009
Author: M. Rosencrans, CPC/NOAA

<http://drought.unl.edu/dm>

Fig. 3b: Texas is the only state with D4 drought condition in the US, although less than one percent of the total area of the state. Significant category improvements occurred this week.

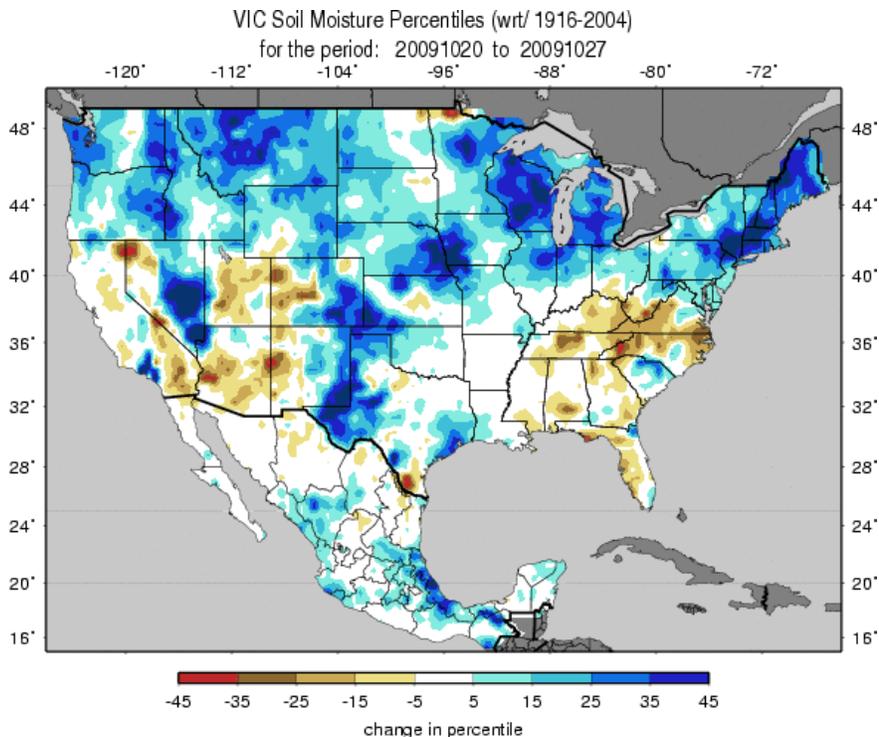
Ref: http://www.drought.unl.edu/dm/DM_state.htm?TX,S

Weekly Snowpack and Drought Monitor Update Report



Figs. 4a: Soil Moisture ranking in percentile based on 1916-2004 climatology as of 27 October. Arizona-Utah and Florida are the driest states this week.

Ref: http://www.hydro.washington.edu/forecast/monitor/curr/conus.mexico/CONUS.MEXICO.vic.sm_qnt.gif



Figs. 4b: Soil Moisture change in percentile based on 1916-2004 climatology for this past week. Clearly much of the US has wet soil conditions. The exceptions are over the Mid-Atlantic States southern California, and parts of the 4-Corner States.

http://www.hydro.washington.edu/forecast/monitor/curr/conus.mexico/CONUS.MEXICO.vic.sm_qnt.1wk.gif

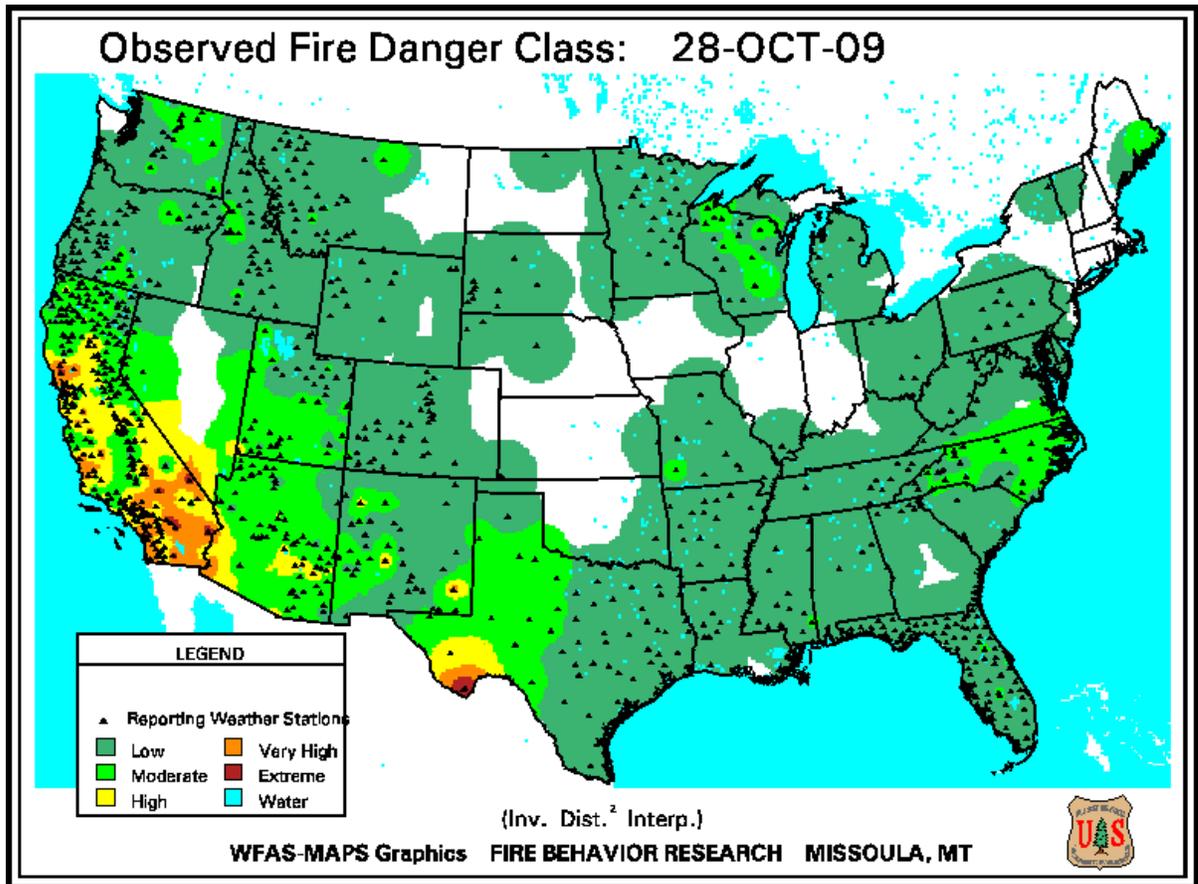


Fig. 5a. Observed Fire Danger Class. Conditions have deteriorated over southern California and the Big Bend region of Texas.

Ref: http://www.wfas.net/images/firedanger/fd_class.gif

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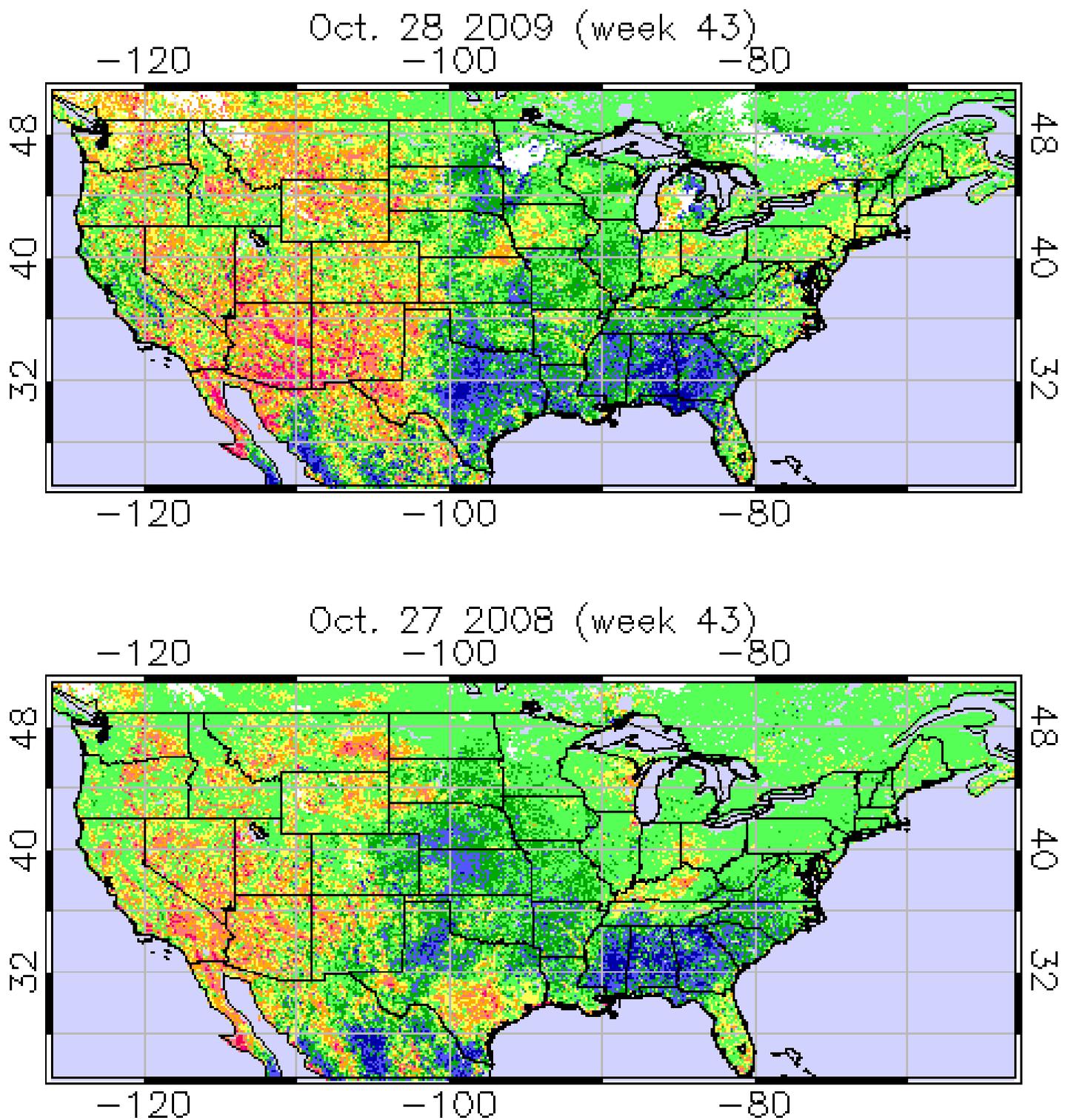
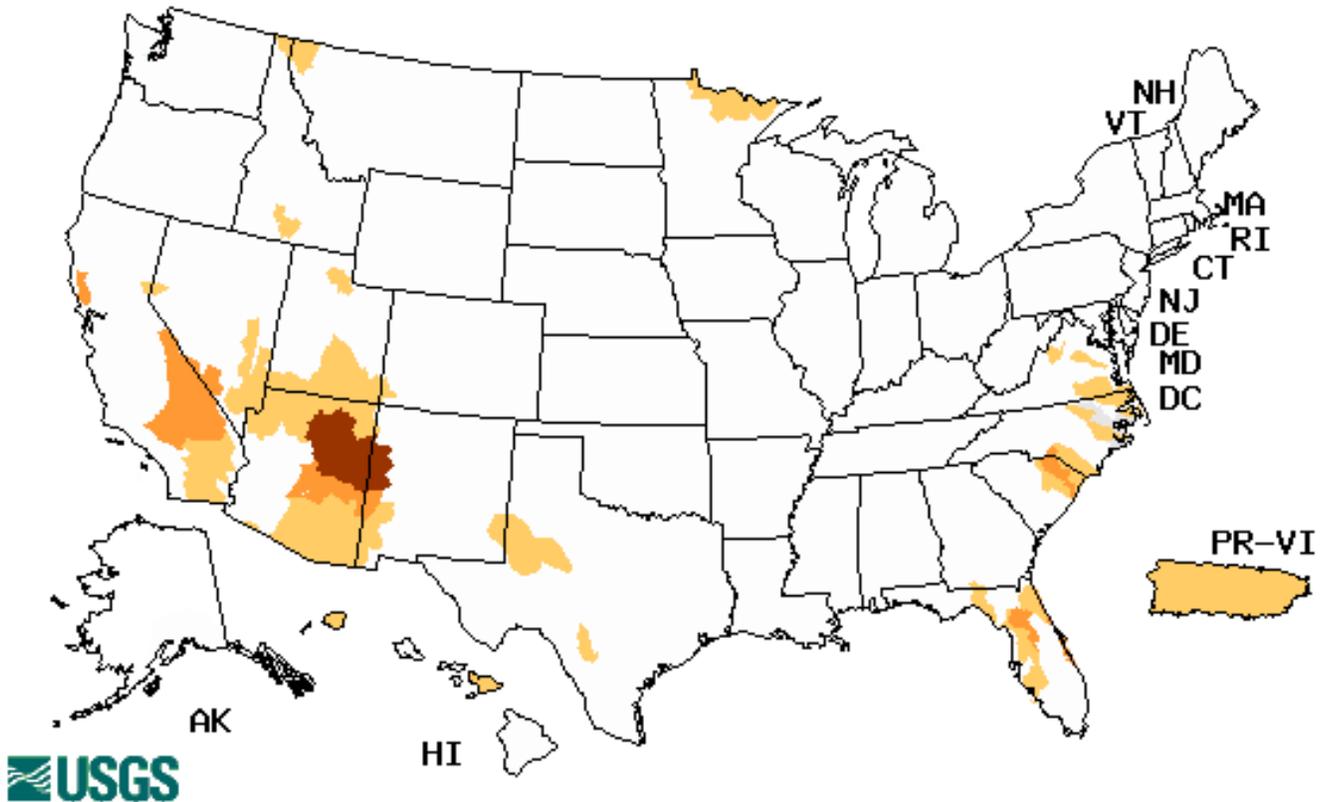


Fig. 6. Vegetation Drought Response Index: Note the comparison to last year.

Ref: http://www.star.nesdis.noaa.gov/smcd/emb/vci/VH/vh_currentImage.php

Weekly Snowpack and Drought Monitor Update Report

Wednesday, October 28, 2009



Explanation - Percentile classes				
Low	≤5	6-9	10-24	Insufficient data for a hydrologic region
Extreme hydrologic drought	Severe hydrologic drought	Moderate hydrologic drought	Below normal	

Fig. 7. Map of below normal 7-day average streamflow compared to historical streamflow for the day of year. Conditions are severe over Arizona but have improved completely over the Upper Peninsula of Michigan.

Ref: <http://water.usgs.gov/waterwatch/?m=dryw&w=map&r=us>.

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National Drought Summary -- October 27, 2009

The discussion in the Looking Ahead section is simply a description of what the official national guidance from the National Weather Service (NWS) National Centers for Environmental Prediction is depicting for current areas of dryness and drought. The NWS forecast products utilized include the HPC 5-day QPF and 5-day Mean Temperature progs, the 6-10 Day Outlooks of Temperature and Precipitation Probability, and the 8-14 Day Outlooks of Temperature and Precipitation Probability, valid as of late Wednesday afternoon of the USDM release week. The NWS forecast web page used for this section is: <http://www.cpc.ncep.noaa.gov/products/forecasts/>.

The period from October 20-26 featured a mean trough in the center of the contiguous 48, with an active storm track into the Pacific Northwest and across the Northeast. Early in the week, storm systems impacted the Pacific Northwest and the center of the country. The storm system in the central and southern plains on October 21st and 22nd intensified and moved northeast, across the Great Lakes and into southeastern Canada. The storm system across the Northwest moved eastward and weakened. In the wake of the low-pressure system in the center of the country, tranquil conditions prevailed over much of the country. The remnants of the Pacific Northwest system provided fodder for the development of another significant storm system stretching from the southern Great Plains to the Great Lakes on Monday. By Tuesday, this system had moved eastward into the Tennessee River Valley.

Mid-Atlantic and Southeast: Dry conditions contributed to increasing rainfall deficits (1-3 inches at 14 days, 1-4 inches at 30 days, and 4-8 inches at 60 days) across North Carolina and southern Virginia. Stream flows remained low across the lower terrain as well, with many streams measured at or below the 25th percentile out to 28 days. Based on those conditions, D1 was expanded across most of central North Carolina. Abnormally dry conditions also expanded and now cover the area from coastal North Carolina to the hill country north of Charlotte. Intermittent improvements in stream flow levels in Virginia over the past month and weekly rainfall totals (0.5-1.0 inch) across the Appalachian foothills restrained the northward expansion of D0. Despite the depiction of D2 in South Carolina, the impacts are localized, with 93 percent of the state reporting adequate or greater soil moisture levels according to United States Department of Agriculture (USDA) reports.

Precipitation (1.0-2.5 inches) that fell from October 23-24 across the panhandle of West Virginia and northwest Maryland alleviated the abnormally dry conditions in that region. The structure of the precipitation was such that areas from southwestern Pennsylvania to the Finger Lakes region of New York that were already experiencing dryness (near 50 percent of normal precipitation at 14-, 60-, and 90-days) missed out on the bulk of the rains, so D0 was introduced.

Across Florida, rainfall amounts were generally less than 0.5 inch. D0, abnormal dryness, was introduced for Glades County based on Keetch-Byram Drought Index values above 500, United States Geological Survey (USGS) wells at or below the 30th percentile, and below-normal rainfall at 60 and 90 days (25-50 percent of normal).

Northern and Central Great Plains and Upper Great Lakes: Significant rains (1.0-3.5 inches) fell across southeastern Nebraska, ameliorating the abnormal dryness across the state. Additionally, on a statewide-average basis, Iowa recorded its wettest week since early June 2008, and October 2009 is already the 6th wettest (137 years of data). D0 was removed from Iowa as well.

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Further north, widespread precipitation totals above 2.0 inches, with some reports of near 4.0 inches, alleviated some of the drought across Southern Minnesota, central and southern Wisconsin, the Upper Peninsula of Michigan. The core area of the drought as depicted on the U.S. Drought Monitor did miss out on the major rains, with the area receiving 0.5-1.5 inches of rain. Given those rainfall totals, improvements were made in central Minnesota. Despite the benefits of improving moisture conditions, some agricultural interests are being hampered by the rains (3 inches above normal for many Minnesota counties in October) and cold temperatures (many nights below freezing), leading to significant harvest delays. In the Upper Peninsula of Michigan, a 1-category improvement was made, with only Gogebic, Ontonagon, and Iron counties remaining in moderate drought (D1) status. In Wisconsin, 1-category improvements were made south of a line from Saint Croix County to Florence County.

Southern Great Plains: Substantial changes were in order for depiction of drought across southern Texas as rainfall totals greater than 4.0 inches were recorded across areas previously in severe drought. The area experienced two important rainfall events, with the latter bringing precipitation southward to the U.S.-Mexican border. The core of the extreme drought centered near Uvalde County largely missed out on the rains, with precipitation totaling 1.0-1.5 inches. Also, the coastal portions of the exceptional drought area near Nueces County received more rainfall than the interior, so this area was diminished in size but not removed. In general, a 1-category improvement was made for most of the drought area, except for the two areas mentioned above, and the area from Zapata County to Duval County.

Improvements were made in eastern New Mexico as rains (0.5-2.0 inches) fell on October 20th and 21st. The abnormally dry area straddling the border between Texas and New Mexico was split into two areas and the remaining area in New Mexico was trimmed to remain outside of areas receiving greater than 0.5 inch of rain this week.

The West: Compared to last week, relatively minor changes in the depiction of drought were made this week. Multiple storm systems triggered widespread rainfall across western Oregon, Washington, northern Idaho and Montana. Improvements, coinciding with 1.5-6.0 inches of rainfall, were made in Washington along a broad swath from Tacoma to the Canadian border. Additional improvements were made across the Olympic Peninsula (Grays Harbor County) and along the coastal ranges in Oregon. Rainfall amounts of 1.5-3.0 inches prompted this improvement. Further east, rainfall amounts of 2.0-3.0 inches prompted improvements in northern Idaho and northwestern Montana.

Based on local inputs from emergency managers and precipitation totals near 0.5 inches, improvements were made in southwest Colorado. Severe drought was removed from the state, and the abnormally dry conditions farther east were trimmed to reflect rainfall totals of 0.5-1.5 inches.

Some degradation was in order around the Lake Tahoe area. Last week's heavy rains were supplanted with near zero readings for rainfall and slightly above normal temperatures (1-2 degrees F) this week. Lake Tahoe is back down to just 0.02 feet above the rim. At 82 percent of average storage, Truckee Basin Reservoirs are in better shape. Additionally, Sierra snowpack has already dwindled back to near nothing.

Hawaii, Puerto Rico, and Alaska: Some heavy rains (1.0-1.5 inches) fell on Oahu, but the localized nature of the rains did not provide the necessary relief from the current dryness. Elsewhere, one windward station on the big island reported 1.8 inches of rainfall, but across the rest of the state, rainfall amounts were less than 0.5 inch.

Weekly Snowpack and Drought Monitor Update Report

In Alaska, stormy weather brought moderate to heavy precipitation (generally 1-4 inches with a maximum of 10.3 inches) to southern Alaska and the Alaskan Panhandle, but failed to materialize inland. Inland stream flows, downstream from the area of abnormal dryness, are still near normal or above normal in many places, so the depiction here remained unchanged.

Rainfall in Puerto Rico exhibited large variability from west to east, with stations on the western half of the island reporting rainfall totals (up to 6.6 inches) that were much greater than on the eastern half (less than 1.0 inch). Dryness out to 14-days is beginning to show up in the analysis, but nothing at longer time scales, so no area of dryness was depicted.

Looking Ahead: During the next 5 days (October 28-November 1), a storm system is expected to intensify in the center of the country. Upslope conditions could trigger heavy snowfall across Wyoming and Colorado early in the period. As the system develops, heavy rains are expected from the Gulf Coast of Texas and Louisiana to Illinois and eastward to New England. Ahead of a system in the Gulf of Alaska, western Washington is expected to be wet. Outside of those areas, little to no drought relief is expected.

The CPC 6-10 day forecast (November 2-6) calls for increased chances of above-median precipitation along the U.S.-Canada border from the Pacific Northwest to the Great Lakes, and below-median precipitation from the Great Basin eastward to the Mid-Atlantic. Above-normal temperatures are favored from the Southwest, across the central and southern Plains, to the Southeast while below-normal temperatures are more likely from the Pacific Northwest to the northern Plains. Colder and drier than normal conditions should prevail in eastern Alaska.

Author: [Matthew Rosencrans, NOAA/NWS/NCEP/CPC](#)

Dryness Categories

D0 ... Abnormally Dry ... used for areas showing dryness but not yet in drought, or for areas recovering from drought.

Drought Intensity Categories

D1 ... Moderate Drought

D2 ... Severe Drought

D3 ... Extreme Drought

D4 ... Exceptional Drought

Drought or Dryness Types

A ... Agricultural

H ... Hydrological

Updated October 28, 2009